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ABSTRACT

A study explored Protection Motivation Theory (PMT) in the context of news reports about a hazard. Content elements of outcome severity, vulnerability, and response efficacy were systematically varied in stories about a fabricated risk: fluorescent lighting lowering student academic performance. Research subjects were 206 students in an introductory journalism and mass communication class who received extra credit for their participation. Subjects received different versions of the fluorescent light story, and at the end of an experimental session they were debriefed as to the purpose of the story, apprised of the deception involved and informed that the hazards mentioned in the experiment did not exist. Results from this laboratory experiment suggest that information about the severity of consequences results in greater information seeking about a hazard. In addition, information about vulnerability, severity, and response efficacy jointly combined to produce higher levels of behavioral intention to take actions designed to avoid the hazard. Overall, results suggest--on both theoretical and practical grounds--that Protection Motivation Theory can and will continue to serve communication researchers as a vehicle for conducting fruitful research. (Contains 8 endnotes, 31 references, a figure, and 3 tables of data. Appendixes contain a summary of research results and summary statistics of variables used in analysis.) (Author/NKA)

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# THE INFLUENCE OF SEVERITY, VULNERABILITY, AND RESPONSE EFFICACY ON INFORMATION SEEKING AND BEHAVIORAL INTENTION

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The influence of Severity, Vulnerability and Response Efficacy on Information Seeking and Behavioral Intention


## Abstract

The purpose of this study was to explore Protection Motivation Theory (PMT) in the context of news reports about a hazard. Content elements of outcome severity, vulnerability and response efficacy were systematically varied in stories about a fabricated risk: fluorescent lighting lowering student academic performance.

Results from this laboratory experiment suggest that information about the severity of consequences results in greater information seeking about a hazard. In addition, information about vulnerability, severity and response efficacy jointly combined to produce higher levels of behavioral intention to take actions designed to avoid the hazard.

# THE INFLUENCE OF SEVERITY, VULNERABILITY AND RESPONSE EFFICACY ON INFORMATION SEEKING AND BEHAVIORAL INTENTION

**Introduction.**

Reporting about environmental hazards is a predictable if not routine task faced by journalists. Nonetheless it is clear that people's reactions to this kind of story is anything but uniform. Responses to reports of environmental hazards range from deafening silence to expressions of outrage or even panic.

Examples of the behavioral "fallout" from these emotional responses abound: News about the chemical Alar applied on apples caused consumers to stop purchasing the fruit, thereby putting at risk financially pressed Washington State growers; reports about plans for a toxic waste-dump site often evoke the so-called a NIMBY response--"not in my back yard"--and its attendant social conflict; and flyers frequently cancel reservations or switch carriers after learning of a fatal airline crash. At least one researcher (Kasperson, 1992) proposes that this phenomenon, which he terms the social amplification (or attenuation) of risk, appears to be related to broad patterns of media coverage. Although it would be presumptuous to claim that information contained in media stories alone is responsible for such reactions, much about the process remains unknown. Exploring more fully the individual

bases for these wider social phenomena is a worthwhile enterprise.

Moreso than social scientists, journalists have a longstanding interest in knowing the public's likely reaction to news about hazards. Among the rationales justifying press freedoms in the United States is the assumption that citizens use information they glean from news reports to engage in personal and collective action. For the journalist, the question of what elements in a news report, column, or editorial will most likely result in citizen action, or lack thereof, becomes a matter of both normative and practical concern.

The present paper attempts to elucidate aspects of news story content that might influence how audiences think, feel and behave when confronted with information about an environmental hazard. As a point of departure, we start with two basic questions: What prompts people to seek more information and what inspires them to change their behavior?

Risk communication researchers concerned with behavioral change have employed a variety of models, often borrowed from ancillary fields such as public health, cognitive and social psychology. Among these are the Health Belief Model (Becker, 1974), Expected Utility (Ronis, 1992), Theory of Planned Behavior (Ajzen, 1985), ACT-R (Anderson, 1990), Theory of Social Behavior (Triandis, 1980), Self Regulative Systems Model (Leventhal & Cameron, 1987) and Protection Motivation Theory (Rogers, 1983). Although

these models share many elements in common, they differ in their choice of and emphasis on the principal variables used to explain people's responses to hazards. In addition, these models often differ in their accounts of the causal order and functional relationships among the explanatory variables employed.[1] In this report, we use one of the more successful and--from the viewpoint of message design--useful approaches, Protection Motivation Theory (PMT).

## I. Protection Motivation Theory.

Protection Motivation Theory (Rogers, 1983; Prentice-Dunn & Rogers, 1986) posits that two underlying processes--threat and coping appraisal --undergird peoples' adoption of protective behaviors when faced with a threat or hazard. **Threat appraisal** is the process whereby a person evaluates the factors that increase or decrease the probability of enacting a maladaptive response. Maladaptive responses depend on the nature of a particular threat and may include: persisting in one's present behavior, failing to change one's behavior, or both. Factors tending to increase a maladaptive response are **extrinsic** rewards (e.g., social approval) and **intrinsic** rewards (e.g., bodily pleasure) associated with the behavior in question. Factors reducing the likelihood of a maladaptive response include the perceived **severity** of, and **vulnerability** to, the hazard. In this model, a fear response elicited by information about a hazard affects only perceived severity but has no direct

effect on the eventual behavior enacted (Prentice-Dunn & Rogers, 1986: 154). The total threat appraisal is a simple algebraic sum of the above-mentioned variables.

The **coping appraisal** process consists of three simultaneous judgments: a belief about the **adequacy** (e.g., will something work?) of a preventive response (**response efficacy**), an assessment of one's **ability** (e.g., can I do this?) to successfully initiate and complete the adaptive response (**self efficacy**), and an estimate of the costs associated with particular course of action (**response costs**). Response and self efficacy increase the likelihood of an adaptive (i.e., coping) response, while response costs decrease the probability of an adequate reaction to a hazard; the relationship among these elements is thought to be linear and additive. Protection motivation itself is not observed directly but rather is an inferred mental state, indexed by behavioral intention, which itself is thought to be the best predictor of behavior (Ajzen, 1985; Kim & Hunter, 1993).

To summarize, Protection Motivation Theory has seven components: perceived severity of the threat, perceived vulnerability to the threat, intrinsic and extrinsic rewards for continuing one's present behavior, perceived efficacy of the response, one's ability to carry out the recommended action and the costs associated with undertaking a different course of action.

More recently, several researchers (Tanner, Hunt & Eppright, 1991)

have proposed what they term an Ordered Protection Motivation (OPM) model, arguing that, rather than occurring simultaneously as the standard PMT model would suggest, threat appraisal precedes coping appraisal. While the data supporting this suggestion are not definitive, the upshot is increased research interest in the role of information seeking and knowledge holding as important variables contributing to both coping and response appraisal.

## II. Research Hypotheses.

**Behavioral Intention.** Researchers have applied Protection Motivation Theory to predict behavioral intention using both experimental and survey methodologies across a plethora of circumstances, including: purchasing insurance (Beck, 1984), cigarette smoking (Maddox & Rogers, 1983), physical exercise (Stanley & Maddox, 1986; Fruin, Pratt & Owen, 1991), preventing nuclear war (Wolf, Gregory & Stephan, 1986), breast self-examinations (Rippetoe & Rogers, 1987), condom use (Tanner, Day & Crask, 1989; Tanner, Hunt & Eppright, 1991; Eppright, Tanner & Hunt, 1994), testicle self examinations (Steffen, 1990), nuclear disarmament activism (Axelrod & Newton, 1991), and safe-sex practices (Van der Velde & Van der Pligt, 1991).

A review of the above studies (See Appendix A for a detailed summary) shows that a simple additive or main effects model usually does not apply; second-and third-order interactions have been found in most research, but the form of the interactions and specific variables involved have

varied greatly across studies. Indeed PMT's progenitors concede that the appraisal and coping processes are not independent of one another (Prentice-Dunn & Rogers, 1986)[2], a point that indirectly buttresses the theoretical argument that appraisal precedes coping. Faced with this set of circumstances, our recourse, if not to the theory, falls to logic for guidance. In essence, we appeal to the notion that contingent causation operates so that outcomes will be maximized when all contributory conditions are present. In other words, behavioral intention will be highest when all presumptive causes are at their highest level as well. Thus, we predict a three-way interaction among response efficacy, vulnerability and outcome severity, such that:

H1: Response efficacy, perceived vulnerability and outcome severity will interact so that an expressed intention to modify behavior will be greatest for persons having knowledge about an adaptive response, perceiving themselves to be vulnerable to a threat and knowing that the resulting consequences are severe.

**Information seeking.** The introduction of information seeking as a variable of interest within the PMT framework raises the issue of its temporal and causal status. Certainly information seeking can be seen as an adaptive or coping response in its own right. On the other hand, information seeking can also be viewed as part of the appraisal process, occurring before any kind of coping response. The small number of studies treating information seeking as a variable suggest that self-efficacy (Beck & Feldman, 1983), general efficacy (response and self efficacy combined) and general threat

(vulnerability and outcome severity combined) all play a role (Brouwers & Sorrentino, 1993; Srinivasan and Rachford, 1991; Rippetoe and Rogers, 1987; Eppright, Tanner & Hunt, 1994). In terms of the present study, one might reason that response efficacy as a form of knowledge would mediate the combined effects of outcome severity and vulnerability; that is, persons who are apprised of an effective remedial action will find it less necessary to continue to seek out alternatives. Likewise, one would expect a non-additive combined effect of vulnerability and outcome severity on information search. Thus:

> H2: Response efficacy, perceived vulnerability and outcome severity will interact when predicting information seeking such that the combined effects of vulnerability and outcome severity will be greatest for subjects unaware of the adequacy of a coping response.

## III. Method

### A. Subjects and design.

Research subjects were 206 students enrolled in introductory journalism and mass communication classes at a large Midwestern university; all received extra course credit for their participation. A 2x2x4 between subjects factorial design was used to evaluate the effects of the three manipulated variables on the dependent measures of interest. Two levels of Outcome Severity (high and low), two levels of Response Efficacy (present and absent), and four levels of Risk Level (high, medium high, medium low and

low) were manipulated.

**B. Procedures and Stimulus.**

Subjects, meeting in groups ranging in size from two to 16, were assigned randomly to one of 16 experimental conditions. The study was presented as an attempt to assess reactions to using electronic versions of news stories issued by the university news service. Subjects were told that all of the stories were selected from the news service's archives. Each subject worked individually at a computer workstation.

After receiving verbal instructions, subjects viewed an on-screen menu listing six news stories created especially for the experiment. Three stories were of general interest to students (on effective time use, apartment hunting tips and a possible change in academic standards) and three stories were about hazards (a parasite in the campus water supply, an illness caused by chemically treated library books, and fluorescent lighting affecting grades). After selecting and reading the stories, subjects answered questions about each potential threat. Data from the fluorescent light story are the focus of this report.

The story indicated that researchers had found that ultraviolet radiation produced by fluorescent lights used in buildings on campus caused people who were experiencing stress while taking exams to have difficulty concentrating, thus lowering grades.

Subjects received different versions of the fluorescent light story consisting of (a) high or low outcome severity (loss of an entire grade per semester or the loss of one-half of one point), (b) an expert recommending the use of sunglasses as an effective response (present or absent), and (c) high, medium high, medium low, or low risk level (odds of one in seven, one in 60, one in 190 or one in 1300 of being affected).

At the end of the experimental session the subjects were debriefed as to the purpose of the study, apprised of the deception involved, and informed that the hazards mentioned in the experiment did not exist.

**C. Dependent Measures.**

**Behavioral Intention.** Behavioral intention was assessed by asking subjects to report the likelihood of their wearing sunglasses at some future date: "Considering your own circumstances and what you know about fluorescent lights on campus, how probable it that you will wear sunglasses while taking exams in the future?" Responses ranged from 0 (zero) "not at all probable" to 100 "definitely will". Only 39 percent of subjects indicated some willingness to change their behavior; a logarithmic transformation was used to normalize the distribution prior to analysis. Appendix B provides descriptive statistics of all variables used in this analysis.

**Information seeking.** Immediately after reading the story about the fluorescent light hazard, subjects were asked to indicate on a 9-point scale

ranging from "not at all interested" to "very interested" the extent to which they wanted to receive more information about the fluorescent light hazard: "How interested would you be in obtaining more information about this topic?"

**D. Other Measured Variables.**

**Fear.** An additive index (alpha=.85) representing fear was created by combining subjects' responses to questions about the hazard (0-100 points): "How worried are you personally that fluorescent lights on campus will cause you to get lower grades?" and "How serious is the problem of fluorescent light lowering exam scores to you personally?"

**Vulnerability.** Subjects estimated the probability that the fluorescent light hazard applied to them. "Considering your own circumstances, how likely is it that you will be one of the persons affected by fluorescent light while taking exams? What are your chances of being affected? My own chances are: One chance in _____. Remember: The smaller the chance, the bigger the number." A logarithmic transformation was used to normalize the distribution prior to analysis.

**Response Efficacy.** Subjects were asked to rate (0-100) wearing sunglasses as a means of avoiding the light hazard: "Please rate how effective it would be for you to wear sunglasses while taking an exam as a way of avoiding the negative effects of fluorescent lights."

**Response Costs.** The cost associated with using sunglasses during

exams was gauged by having subjects rate the magnitude (0-100 scale) on each of the following attributes: Inconvenience, expense, unpleasantness, disruption of daily life, difficulty, complexity, interference with usual habits, effort required, social embarrassment and extra time required. Principal components factor analysis revealed a single factor (Kaiser criterion) accounting for 52.2 percent of the variance and a scale using factor weights was used in subsequent analysis (alpha=.88).

**Intrinsic/Extrinsic Rewards.** In the case of the fluorescent light hazard, there is no maladaptive behavior associated with the lack of action, that is, wearing or not wearing sunglasses are two sides of the same coin. So we measured the intrinsic and extrinsic rewards and punishments associated with wearing sunglasses by asking subjects to rate (0-100) their personal and friend's **like** and **dislike** of wearing sunglasses. Factor analysis resulted in a single factor accounting for 52.0 percent of the variance and a factor-weighted scale was created (alpha=.65).

**Other variables.** Additional variables were measured and served where appropriate as statistical controls. These include: time spent reading the story, assessment of the story's believability, the certainty of the subject's behavioral intention (Lazarus & Smith, 1988, Price, 1989) and a subjects' self-efficacy rating of their ability to use sunglasses.[3]

**E. Statistical Analysis.**

Three-factor fixed effects ANOVA was used to examine the influence of outcome severity, response efficacy and vulnerability on subjects' desires to obtain more information about the hazard and their intention to use sunglasses while taking examinations in rooms with fluorescent lights. Analysis of covariance, correlational analysis and multiple regression was also used to elaborate the analysis and evaluate magnitude of effects.

**IV. Results.**

**A. Manipulation checks.**

Manipulation checks using 2 X 2 X 4 ANOVAs were run on subjects' estimates of perceived response efficacy, outcome severity and vulnerability. The response efficacy measure was significant, $F(1,190)=7.67$, $p=.006$; subjects exposed to information about sunglasses being an effective response to the hazard reported higher ($M=35.49$ $Sd=35.79$) levels of perceived efficacy than those subjects not exposed to this information($M=22.78$, $Sd=29.20$).

Similarly, a significant main effect for the outcome severity manipulation was found, $F(1,190)=24.64$, $p<.001$. Subjects exposed to the high outcome severity condition registered higher levels of fear ($M=84.48$ $Sd=61.81$) than subjects in the low outcome severity condition ($M=43.93$, $Sd=51.66$).

And a significant main effect for the risk baserate manipulation also was found for vulnerability, $F(3,190)=3.18$, $p=.025$. A Duncan multiple range

test revealed that the high risk baserate group (M=5.72, Sd=3.78) differed significantly from the low (M=7.47, Sd=2.92) and medium low (M=7.65, Sd=3.85) groups in their degree of perceived vulnerability to the fluorescent lighting hazard.[4] No other significant main effects or interactions were detected for any of the manipulation checks.[5]

**B. Behavioral Intention.**

It was hypothesized (H1) that the degree of behavioral intention to wear sunglasses in exam situations would be greatest for subjects who received information indicating that they had the most to lose, who were most likely to be susceptible, and who were aware of an effective solution. Analysis of variance revealed a main effect for outcome severity, $F(1,190)=8.59$, $p=.004$ and a significant three-way interaction among outcome severity, vulnerability and response efficacy, $F(3,190)=2.94$, $p=.034$.

Table 1 displays the cell means and reveals the hypothesized interaction. Subjects in the high-severity, high-vulnerability, high-response efficacy cell were most likely to signal their intention to modify their behavior. A Duncan multiple range test showed that this key cell was significantly different from other cells having a mean value of .77 or less. Response efficacy appears to play a key role, with the low efficacy condition accounting for seven of nine differences. Figure 1 displays the interaction in graphical form. Analysis of covariance suggests that this interaction is robust;

the interaction maintained its statistical significance when controlling for certainty, self-efficacy, story believability, time spent reading the story, perceived costs and perceived rewards of wearing sunglasses.

**C. Information Seeking.**

Earlier it was hypothesized (H2) that information seeking about the hazard would be highest for subjects who would be unaware of an effective response to the hazard yet exposed to information conveying a high degree of vulnerability and more severe negative consequences, that is, information seeking would be greatest in the high severity-high vulnerability-low response efficacy cell. A three-factor ANOVA was used to assess the effects of outcome severity-by-response efficacy-by-vulnerability on information seeking. A significant main effect for outcome severity was found, $F(1,190)= 18.64$, $p<.001$. Analysis of covariance, controlling for self-efficacy, story believability, time exposed to the story, perceived costs and perceived rewards for wearing sunglasses, revealed similar results. Thus the second hypothesis was disconfirmed. Rather than finding an expected interaction between vulnerability and outcome severity, only subjects in the high outcome severity condition ($M=5.90$, $Sd=2.23$) were more likely to indicate a desire for additional information about the hazard than those subjects in the low severity condition ($M=4.61$, $Sd=1.98$).

**D. Additional Analysis.**

The Protection Motivation Theory implies that several intervening constructs and exogenous variables also operate to produce effects. Regression analysis was used to understand their particular role and relative degree of influence. Before doing so, however, an examination of their intercorrelations is instructive. Table 2 shows very few, if any, surprises. Information seeking and behavioral intention show only modest overlap (r=.18), suggesting that these two constructs do indeed represent distinct stages in the overall protection motivation process. Perceived vulnerability, scaled so that a lower score indicates a greater perceived threat, is negatively related to information seeking. Fear is significantly associated with seeking information, behavioral change, vulnerability and response efficacy.[6] Response efficacy is positively correlated with intentions and self efficacy but demonstrates a negative relationship to perceived barriers. In other words, the more barriers one perceives, the less likely one believes that wearing sunglasses is an effective prevention strategy. The same relationship, only stronger, exists for self-efficacy and perceived barriers. The perception of barriers to action is correlated with fear and with information seeking, with this latter relationship suggesting that subjects may have been looking for alternate ameliorative measures that they could take. Not unexpectedly, response and self-efficacy are positively correlated, and self efficacy shows a

positive relationship with intrinsic-extrinsic rewards for sunglass use. Interestingly, perceived rewards for sunglass use is unrelated to most other variables, the notable exception being information seeking. Here one sees that greater intrinsic-extrinsic reward is associated with lower information seeking.

Hierarchical multiple regression analysis was used to assess the absolute and relative effects of the experimental manipulations on both intervening variables and principle dependent variables.[7] The results, as summarized in Table 3, indicate that the experiment was best at manipulating fear (13 percent effect), followed by an eight percent effect for both perceived vulnerability and response efficacy. The table also shows the direct effect of each block of variables, first controlling for the influence of other variables used in this research report. Some five percent of the variance in subjects' information seeking is attributable to the experimental manipulations; for behavioral intention a six percent effect can be ascribed to the experiment.

**V. Discussion and Conclusions.**

The present study largely confirms particular hypotheses derived from the protection motivation literature; message effects were found for both information seeking and behavioral intention. And overall, the results suggest--on both theoretical and practical grounds--that Protection Motivation Theory can and will continue to serve risk communication

researchers as a vehicle for conducting fruitful research.

To review, outcome severity, vulnerability and response efficacy had a non-additive effect on behavioral intention; the effect of these message elements was most pronounced when the risk from the hazard, outcome severity and response efficacy were at their highest levels. In this respect, the results provide solid support for the Protection Motivation approach.

Outcome severity directly influenced subjects' information seeking behavior--the more severe the consequences to a student's GPA, the greater was the desire to obtain more information about the hazard.

The finding that outcome severity influenced information seeking also has significance in light of Tanner, Hunt & Eppright's (1991) proposal that threat appraisal precedes coping appraisal. While our results are consistent with this view, given our research design they are anything but definitive. But it is interesting to note that questions about the **kind** of information sought could shed much light on the issue. For example, persons desiring information about how the hazard more precisely affects their particular circumstances may be seeking **diagnostic** information that links broad statistical patterns with their unique situation (Vorauer & Ross, 1993). Similarly, finding that persons are seeking more "how to" information would imply that they have moved beyond threat appraisal and are formulating a coping response. And at each "stage" one

can well imagine persons seeking **normative** information about others' reactions and notions of an appropriate response to the threat itself, recommended actions, or action alternatives.

In terms of practical implications for message design, this study provides straightforward "rules of thumb" for the practicing journalist. News stories containing information about the severity of a hazard's effects can be expected to promote further information seeking. And reports containing three elements--level of risk, severity of consequences and the availability of effective actions--can be expected to generate the greatest change in peoples' intentions and actions.

Another aspect to note in this regard is that this study did not manipulate self-efficacy--a person's beliefs about his or her ability to perform successfully a particular preventive behavior. Now, in the present case, the amount of competence required to wear sunglasses may seem minimal for nearly everyone, but solutions and remedies to "real world" hazards may require a series of fairly complex steps. Providing information that allows people to assess their own abilities and to foster the development of their capabilities, and studying possible audience effects when this occurs, are worthy goals for journalists and social scientists alike. More generally, it is also worth noting that much of the work in this area has focused on **individual** strategies for change. No less important a topic to consider is

peoples' sense of response and self-efficacy toward **collective** action.[8]

The effect size attributable to the experimental manipulations was on the order of five-to-six percent, a figure consistent with results from researchers manipulating similar variables (Griffin, Neuwirth & Dunwoody, 1995). While recognizing that the experimental situation maximized audience members' attention, even a five-to-one drop-off in efficiency still would represent fairly widespread effects on a mass scale. Of course, a large share of variance was unexplained as well, and this alone argues that researchers would do well to incorporate ideas from other models attempting to explain behavior (See Weinstein, 1993).

The point about the experimental situation maximizing attention can be extended as well, when one considers that the experimental stimulus materials consisted of news stories in text form. Text, of course, allows the reader the luxury of rereading. The use of tape recorders and VCRs aside, the ability to review information is not the typical case with radio or television. Because of this processing constraint, one suspects that judgments about hazards and resulting actions based thereupon are likely to be "distorted" by the characteristics of the channel being used. Thus the cognitive heuristics employed across mediated channels likely will be different (Nisbet & Ross, 1980).

Of course, the discussion so far assumes the equivalence of stimuli

across channels. Qualitatively different stimuli likely will produce differential effects, and one could pose the questions such as: Is one five-second shot of a dying victim equivalent to X print mentions of symptoms? Journalists, using their intuition, likely would argue for the former over the latter. It's an empirical question, to be sure, but there is a broader issue at stake. Lay persons' intuition holds that there is a point where the commonly practiced journalistic technique of personalization crosses over to sensationalism. What leads to judgments of sensationalism in the context of reporting about hazards is an unanswered question. Clearly, such a judgment would imply that the inferences people draw and actions they take on the basis of press reports are "irrational"--out of proportion to what is at stake--and that some are harmed as a result. Such judgments imply that people use some kind of implicit criterion for judging human rationality, the study of which has and will continue to engage researchers for decades to come.

## Endnotes

1. See Weinstein (1993) for a review of four of these models.

2. Weinstein (1983) also notes this difficulty.

3. The program controlling the presentation of stimulus materials recorded the time spent reading reach story. Believability was indexed by asking subjects to rate on a 9-point scale ranging from no doubt to complete doubt: "Please rate any doubts that you may have had about the accuracy of the story on fluorescent lights in classrooms lowering grades, while you were reading and thinking about it." Subjects' degree of certainty about behavioral intentions was rated as follows: "How certain are you about the answer you just gave? Please use any number between 0 (zero) percent and 100 percent where a 0 (zero) means "not at all certain" and 100 means "completely certain." Self-efficacy was assessed as follows: "Please rate you own ability to wear sunglasses while taking exams. Here 0 (zero) means not at all able and 100 means completely able to wear sunglasses while taking exams."

4. The scaling on the perceived vulnerability scale is such that a lower score indicates greater perceived risk.

5. ANOVAs also were run for the control variables used in the analysis. In only two instances were any significant main effects or interactions found. Subjects in the low outcome severity condition (M=5.31, Sd=2.20) registered the risk scenario (t=-1.95, p=.053) as more believable than did subjects in the high outcome severity condition (M=5.91, Sd=2.25). And a significant outcome severity by response efficacy interaction was found for self efficacy, F (1,190)=4.19, p=.042. A Duncan multiple range comparison of means revealed that subjects in the low outcome severity-high response efficacy cell (M=16.33, Sd=26.88) were significantly lower in perceived self efficacy than subjects in the high response efficacy-high outcome severity (M=30.49, Sd=35.12) and low response efficacy-low outcome severity (M=30.25, Sd=38.14) cells.

6. Griffin, Dunwoody, Zabala and Kamerick (1994) found that a related variable, worry about the hazard, correlated with seeking information about the hazard of cryptosporidium in local tap water.

7. Effects coding (Cohen & Cohen, 1975; Edwards, 1979) was used to represent the main effects and interactions of the manipulated variables. The effect size reflects the R-Squared for the experimental variables entered as a block **after** all other variables in the analysis were first entered.

8. See Lemert, Mitzman, Seither, Cook & Hackett (1977) for a discussion of mobilizing information.

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FIGURE 1. INFLUENCE OF OUTCOME SEVERITY, RESPONSE EFFICACY AND VULNERABILITY ON BEHAVIORAL INTENTION

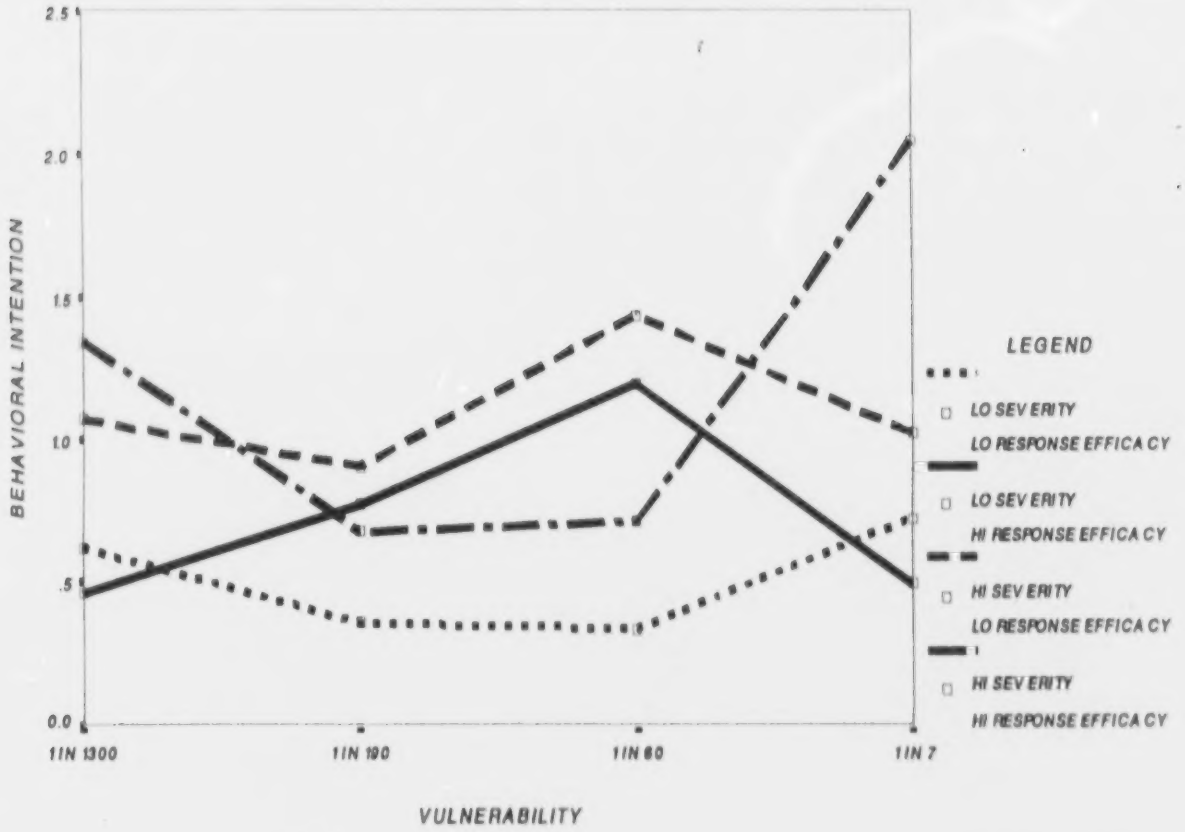






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Table 1. Behavioral Intention by Outcome Severity by Response Efficacy by Vulnerability.

**HIGH OUTCOME SEVERITY**

| | VULNERABILITY | | | | |
|---|---|---|---|---|---|
| | 1 in 1300 | 1 in 190 | 1 in 60 | 1 in 7 | Total |
| High Response Efficacy | 1.34 | .67* | .71* | 2.05++ | 1.19 |
| Low Response Efficacy | .46* | .77* | 1.19 | .49* | .73 |

**LOW OUTCOME SEVERITY**

| | VULNERABILITY | | | | |
|---|---|---|---|---|---|
| | 1 in 1300 | 1 in 190 | 1 in 60 | 1 in 7 | Total |
| High Response Efficacy | 1.07 | .90 | 1.44 | 1.02 | 1.11 |
| Low Response Efficacy | .62* | .36* | .36* | .72* | .51 |
| Total | .86 | .68 | .92 | 1.07 | .88 |

n=206. Cell entries are means. ++Cell is significantly different from cells marked with an asterisk (*).
*Cell is significantly different from cell marked with double plus (++).

Table 2. Correlations of select variables in analysis.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Information Seeking (1) | --- | | | | | | | |
| Behavioral Intention (2) | .18** | --- | | | | | | |
| Perceived Vulnerability (3)[a] | -.15* | -.11 | --- | | | | | |
| Perceived Fear (4) | .42*** | .29*** | -.44*** | --- | | | | |
| Perceived Response Efficacy (5) | .11 | .20** | .13 | .23*** | --- | | | |
| Perceived Self Efficacy (6) | .04 | .12 | -.06 | .07 | .36*** | --- | | |
| Perceived Barriers (7) | .15* | -.04 | .07 | .14* | -.20** | -.52*** | --- | |
| Intrinsic/Extrinsic Rewards (8) | -.11 | .07 | -.04 | .00 | .05 | .20** | -.30*** | --- |

n=205. Entries are Pearson correlation coefficients. *p<.05 **p<.01 ***p<.001
[a]Scaled so that a lower score implies a greater level of vulnerability.

## Table 3. Decomposition of Effects in Experiment

| | Intervening Variables | | |
|---|---|---|---|
| | Fear | Vulnerability | Response Efficacy |
| Experimental Block | .13 | .08 | .08 |
| Main Effects and Interactions | | | |

| | Dependent Variables | |
|---|---|---|
| | Information Seeking | Behavioral Intention |
| Baseline Control[a] | .02 | .19 |
| Time reading<br>Believability<br>Certainty | | |
| Intervening Variables | .08 | .06 |
| Fear<br>Vulnerability<br>Response Efficacy | | |
| Other Variables | .02 | .01 |
| Self Efficacy<br>Perceived Barriers<br>Intrinsic/Extrinsic Rewards | | |
| Experimental Block | .05 | .06 |
| Main Effcts and Interactions | | |

Entries are R-squared for each block of variables, controlling for all other variables in the analysis.
[a]Block does not control for other variables in analysis.

## APPENDIX A. Summary of research results

| Study | Type | Independent Variables Used | Dependent Variable | Findings |
|---|---|---|---|---|
| Aspinwall et al., 1991 | Survey | PROB, RE, SE, HIV Status<br>Partner Status<br>Barriers to change<br>Behavioral Intention | Number of Sexual Partners | RE x HIV Status x Partner Status Ixn<br>PROB x HIV Status x Partner Status Ixn<br>SE x HIV Status X Partner Status Ixn |
| | | | Number of Anonymous Partners | PROB x HIV Status Ixn<br>Barriers x Partner Status Ixn<br>Age x Intention Ixn |
| Axelrod & Newton, 1991 | Survey | PROB, SEV, RE, SE | Disarmist and Deterrentist Activity | PROB, SEV, SE positively related to activism |
| Beck, 1984 | Experiment | PROB, SEV, RE, SE | Intention to purchase Insurance | Significant main effects for SEV & RE |
| Beck & Feldman, 1983 | Survey | PROB, SEV, SE | Information Seeking | SE positively related to Information Seeking |
| Brouwers & Sorrentino, 1993 | Experiment | Threat (PROB + SEV)<br>Efficacy (RE + SE)<br>Uncertainty | Information Seeking | Threat x Efficacy x Uncertainty Ixn |
| | | | Take Medical Test | Threat x Efficacy x Uncertainty Ixn |
| Fruin, Pratt & Owen, 1992 | Experiment | SE, RE, Response Costs | Intention to Exercise | SE positively related to intention |
| Ho, 1992 | Experiment | PROB, SEV, SE | Change Smoking Behavior | PROB x SE Ixn |
| Maddux & Rogers, 1983 | Experiment | PROB, SEV, SE, RE | Intention to give up smoking | PROB x RE x SE Ixn |
| Ripetoe & Rogers, 1987 | Experiment | SEV, SE, RE | Breast Self Exam Intentions, Coping responses (w/in Ss) | Main effect for SEV<br>RE x Coping Ixn |

**APPENDIX A. Summary of research results (contd.)**

| Study | Type | Independent Variables Used | Dependent Variable | Findings |
|---|---|---|---|---|
| Srinivasan & Ratchford, 1991 | Survey | Perceived Risk of Loss | Information search Activities | Indirect effect of Risk mediated through Perceived benefits |
| Stanley & Maddux, 1986 | Experiment | RE, SE, Outcome Value | Attitude, Behavioral Intention Toward Exercise Program | Main effects for SE & RE |
| Steffen, 1990 | Experiment | Prior Knowledge, Brochure (w/PROB, SEV, SE, RE info) about testicular self exams | Attitude<br>Behavioral Intention<br>Subjective Norm | Prior Knowledge x Brochure Ixn for Attitude behavioral intention and subjective norm |
| Tanner, Hunt & Eppright, 1991 | Experiment | Threat, Coping response | Behavioral Intentions about sexual practices | Perceived severity of risk negatively related to maladaptive behaviors<br>Fear positively related to a coping response |
| Tanner, Day & Crask, 1989 | Experiment | PROB, SE | Behavioral Intention about condom use | Main effects for PROB, SE |
| Van der Velde & Van der Pligt, 1991 | Survey | PROB, SEV, SE, RE | Behavioral intentions about safe sex | PROB, SEV, SE, RE all associated with behavioral intentions |
| Wolf, Gregory & Stephan, 1986 | Survey | PROB, SEV, SE, RE | Behavioral Intentions about anti-nuclear war activities | PROB x SEV Ixn<br>SE x RE Ixn |

Legend: PROB=Probability of occurrence; SEV=Outcome Severity; SE=Self Efficacy; RE=Response Efficacy

**APPENDIX B. Summary statistics of variables in analysis.**

| Dependent Variables | Mean | Min. | Max. | Sd. | Skew | Kurtosis |
|---|---|---|---|---|---|---|
| Information Seeking | 5.25 | 1.00 | 9.00 | 2.20 | .00 | -.90 |
| Likelihood of Wearing Sunglasses[a] | .88 | 0.00 | 4.62 | 1.33 | 1.31 | .39 |
| **Intervening Variables** | | | | | | |
| Fear | 63.52 | 0.00 | 200.00 | 60.13 | .61 | -1.02 |
| Response Efficacy | 29.14 | 0.00 | 100.00 | 33.20 | .87 | -.66 |
| Self Efficacy | 25.55 | 0.00 | 100.00 | 33.61 | 1.19 | -.06 |
| Perceived Odds[a] | 6.90 | 1.10 | 18.42 | 3.57 | .77 | .87 |
| **Control Variables** | | | | | | |
| Certainty | 85.69 | 0.00 | 100.00 | 26.29 | -2.11 | 3.50 |
| Believability | 5.61 | 1.00 | 9.00 | 2.24 | -.34 | -.97 |
| Perceived Barriers | .00 | -3.08 | 1.66 | 1.00 | -.58 | -.42 |
| Intrinsic/Extrinsic Rewards | .00 | -3.08 | 1.55 | 1.00 | -.72 | .08 |
| Time Reading Story | 83.71 | 46.23 | 184.30 | 20.42 | .94 | 2.24 |

[a]Log transformed.